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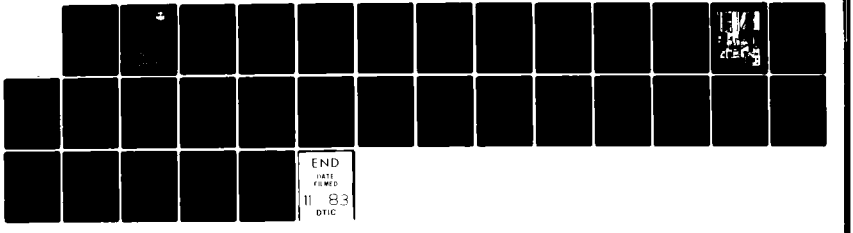

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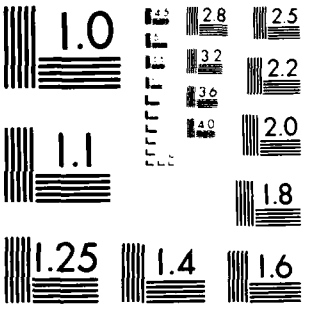

CONTROL, DECONTAMINATION AND DISPOSAL OF MERCURY

Environmental and Environmental Health Laboratory
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Practical procedures are presented for the control, decontamination and disposal of mercury. The physical and chemical characteristics of mercury and the most feasible cleanup procedures are discussed. Shortcomings and detailed procedures for using the calcium polysulfide method of decontamination are described. Problems involved in the decontamination of carpeting are presented. The toxicity and monitoring procedures relating to mercury are covered, along with first aid treatment.

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This technical report has been reviewed and is approved for publication.

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CONTROL, DECONTAMINATION AND DISPOSAL OF MERCURY

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SECTION I

INTRODUCTION

1. Frequently personnel at the USAF Occupational and Environmental Health Laboratory (AFSC) are asked about the control, decontamination, and disposal of mercury and mercury solutions.* Available information has been compiled in this report for the convenience of Environmental Health Services personnel.

2. Location of mercury on Air Force bases varies depending on the size and type of base, but certain common locations are the instrument repair areas, test cell control rooms, mercury recovery areas, dental clinics and altitude chambers. Mercury is used in manometers, thermometers and, other laboratory instruments; i.e., mercury diffusion pumps, gyro dampeners, mercury vapor lamps, Mallory cells, batteries, transistor power supplies, and some electronic tubes.

*Mercury as discussed in this document includes elemental mercury and inorganic mercury compounds.

SECTION II

PHYSICAL AND CHEMICAL CHARACTERISTICS

Mercury is a heavy, silver-white metal liquid at room temperature and the only metal known to be liquid at $0^{o}C$. It oxidizes slowly and is insoluble in common solvents, water and alkalis. Mercury vaporizes at room temperature. Surface oxidation and dust may inhibit vaporization; however, it continues when fresh surfaces are exposed by abrasion, agitation, or vibration. Mercury is very dense, has a high surface tension and such a low viscosity that pouring without splashing and spilling is almost impossible. Vapor concentration depends upon the surface temperature, the extent of the surface exposed and the rate of air exchange. Certain properties or characteristics which contribute to the difficulties of handling mercury safely are:

a. Insolubility in water: This property and the tendency to form small droplets make cleaning and decontamination after spills extremely difficult.

b. Density: Small volumetric quantities are heavy and difficult to handle.

c. Difficulty of containing mercury: The weight of mercury causes many standard types of laboratory containers to crack or break. Droplets resulting from spills vary in size from large to minute. Mercury does not wet most surfaces. Drops tend to roll away, enter small holes and cracks, and subsequently vaporize and contaminate the air.

d. Amalgamation: Mercury in sewer drains will amalgamate with lead and may cause leaded joints to leak. Mercury amalgamates with many metals. Because of this property, contact with mercury may damage metal parts, air frame components, equipment and jewelry.

SECTION III

GENERAL GUIDELINES FOR MERCURY CONTROL

1. The control of mercury exposures is facilitated if flooring materials are made of nonporous, seamless, or impervious material. Carpeting or asphalt tile with numerous joints is not recommended. Sheet linoleum or sheet polyvinyl chloride with sealed joints and coved edges are recommended. A nonskid floor wax should also be applied to the surface. Work benches or table tops where mercury is used should be fitted with trays or retaining walls to contain mercury spills.

2. Sufficient general ventilation should be provided to prevent an increase of mercury vapor in the air. The atmosphere should be periodically tested for contamination. Spilled mercury should be promptly removed and the area decontaminated following procedures described in the section on "Decontamination." If this is not possible local exhaust ventilation should be considered; however, mercury emissions must be consistent with appropriate environmental standards.

3. In laboratories or areas where mercury is handled regularly, clothes and shoes used in the work area should be removed before leaving the area. Coveralls of a nonwoven or tightly woven fabric which exhibit a minimum tendency to adsorb mercury should be worn. Clothing should be checked for mercury following a spill or manometer blowout since droplets can be deposited in trouser cuffs, pockets and shoes. No smoking, drinking or eating should be permitted in these areas. Area cleanliness and personal hygiene must be stressed.

4. Manometers should be provided with mercury traps and check valves to prevent blowouts.

5. Mercury must be stored in plastic containers; e.g., polyethylene, to minimize problems from breakage. Shipping cartons containing plastic bottles with mercury should have a label warning against using a knife with a downward motion to open the cartons, in order to prevent cutting the plastic bottles. Where possible mercury containers and processes should be enclosed or segregated.

SECTION IV

DECONTAMINATION PROCEDURES

GENERAL

1. Accidental spills of mercury must be cleaned up immediately to prevent vapors from entering the air. Spilled mercury may be vacuumed up by using rubber or glass tubing for a pickup probe connected to a Greenburg-Smith impinger (preferably with a broken impinger tip) or flask, attached to a vacuum pump. Figure 1 shows a typical setup for a dental clinic. All visible mercury droplets should be picked up since any remaining droplets are a possible source of mercury vapor. Raise the rubber tubing before turning off the vacuum to insure that all drops in the tubing are collected. The need for respiratory protection should be considered during any decontamination procedures.

2. After removing the visible mercury, the contaminated surface should be cleaned liberally with calcium polysulfide (HgX) solution. A screening test should be performed with the MV-2 to find local pockets of mercury, recleaning the area if necessary.

3. If mercury is detected using the MV-2, quantitative sampling should be considered using Hopcolite tubes.

4. If results are greater than 0.05 mg per cubic meter, as measured at the breathing zones, clean surfaces liberally with HgX and iodized activated charcoal which will further suppress vaporization. Use approximately 50 mesh activated charcoal which is dry blended with 7% (by weight) iodine crystals. This compound will absorb mercury vapors and the chemical reaction within the charcoal would then form mercuric iodide.

5. The Lab Safety Supply Co, P.O. Box 1422, Janesville WI 53545, Toll Free Number 800-356-0783, markets a number of useful products which are believed to be effective in decontaminating mercury spills. Their products consist of a hand operated vacuum (Hg Vac^{R}) to pick up the visible material and sponges containing a decontaminating solution (Hg Absorb^{R}) for cleaning residual contamination from surfaces. A powder form of the decontaminant (Hg Absorb^{R}) is also available for use in areas where sponges cannot reach. The current cost of these items are:

No. 17-720	Mercury Spill Control Station	$78.00
-721	Hg Vac^{R}	38.50
-722	Hg Absorb^{R} Powder, 1000 g	30.35
-724	Hg Absorb^{R} Sponges, pkg 12	23.40

SECTION V

DECONTAMINATION PROBLEMS

Carpeting

1. Carpeting must not be installed in an area where there is a high potential for mercury contamination, such as in dental clinics. Existing carpeting, once its useful life has expired, should be replaced with seamless sheet vinyl linoleum which turns up at the walls and eliminates seams. It has been reported (Ref 1) that once carpeting has been contaminated with mercury it is practically impossible to decontaminate it to an acceptable level. Buchwald (Ref 2), the US Navy (Ref 3) and the Environmental Health Lab, McClellan (Ref 4) have recommended that carpeting not be used in dental clinics.

2. Industrial and household vacuum cleaners are not designed to resist the corrosion of mercury. They have also been shown to increase airborne mercury levels and to spread contamination throughout facilities (Ref 1).

Asphalt or vinyl tile

These tiles, commonly produced in 9 inch squares, must not be used in an area where mercury is routinely utilized. The seams between the tiles can trap mercury droplets, hamper decontamination and subsequently release mercury vapor to the room atmosphere.

SECTION VI

DECONTAMINATION STUDIES

1. The Air Force Environmental Health Laboratory, McClellan, compared the efficiency of two mercury cleanup procedures (Ref 4). One technique utilized a Mercury Sweeper (C6375) marketed by Scientific Products and the other employed vacuuming visible droplets into an aspiration bottle with water trap and covering the area with a solution of HgX^R (essentially calcium polysulfide). McClellan EHL concluded that the Mercury Sweeper was essentially ineffective on carpeted floors. They also recommended that cleanup of mercury on carpeted floors be accomplished by vacuuming with either a $MerVac^R$* (a specially designed mercury vacuum cleaner) or a water trap aspiration system followed by a wet HgX or calcium polysulfide treatment (Appendix A).

2. According to Steere (Ref 5) attempts to control mercury vapor with calcium polysulfide and with flowers of sulfur were not effective when the floor was rubbed after the chemicals had been removed. He found that mercury vapor concentrations approached those concentrations that were present before treatment was attempted. He concluded that the critical process seemed to be to remove as many of the mercury droplets as possible before attempting to "fix" the contamination by chemical coatings such as calcium polysulfide.

3. Copplestone and McArthur also evaluated several methods for reducing the vaporization of mercury (Appendix B). The results of their investigation showed that the use of sulfur calcium oxide and water mixture was the most successful method for fixing mercury droplets. A second convenient technique particularly suitable for mercury in inaccessible crevices was the use of an aerosol hair spray. Flowers of sulfur were found to be inefficient for fixing mercury in this study. The authors did not evaluate the effect of rubbing or vibration, such as would occur with foot traffic, on their techniques.

*The $MerVac^R$ is no longer being manufactured at this time.

SECTION VII

MERCURY WASTE DISPOSAL

1. Contaminated mercury and scrap amalgam must be kept in a tightly closed container, containing HgX solution in a sufficient quantity to cover the waste. Scrap amalgam must not be discarded as normal waste. Excess amalgam and squeeze cloth, if used, must be placed in a tightly closed nonmetallic container.

2. Articles contaminated with mercury (paper tissue, chamois leather, squeeze cloths, etc.) should be kept in sealed containers until disposal is possible (polyethylene bags are suitable); these may then be disposed of in the normal garbage collection.

3. Contaminated mercury or mercury picked up after spills can be reprocessed at Air Force mercury reclamation centers, such as the Materials Laboratory at Sacramento or Warner-Robins ALC/MANC. Information regarding Air Force reclamation centers is in T.O. 42C-1-18.

4. A number of firms have stated that they will accept waste mercury for reprocessing. A list of reprocessors who will supply shipping flasks is included in Table I.

Table I

Reclamation and Processors of Mercury

Mercury Reclamation:

Mallory Battery Co.
U.S. Highway 64 East
Plant #2
Lexington NC 27292

Mercury Processors:*

General Refineries Inc
292 Walnut Street
St Paul MN 55102

Goldsmith Bros
Div of N.L. Industries
900 West 18th Street
Chicago IL 60608

D.F. Goldsmith Chemical and Metal Corp.
909 Pitner Ave
Evanston IL 60202

Simmons Refining Co
1704 S. Normal Street
Chicago IL 60616

*Accept Mercury in any form for a price.

SECTION VIII

RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING

1. Personal protective equipment is not acceptable as a substitute for adequate engineering controls, but is appropriate for unavoidable exposures where excessive atmospheric concentrations result from emergencies or from short-term maintenance or repair operations.

2. Workers exposed to levels of mercury vapors below 0.25 mg/m^3 may wear the 3M Brand Mercury Vapor Respirator Number 8707. The 8707 is designed for protection against elemental mercury vapor concentrations up to 0.25 mg/m^3 for a full eight hour shift. The 8707 is not NIOSH approved since present NIOSH test schedules do not cover mercury vapor. However, when used in accordance with OSHA Program Directive Number 300-9, G.I.g., the product is considered "accepted" respiratory protection.

3. Workers exposed to mercury vapors below 0.5 mg/m^3 may wear a half mask respirator* equipped with iodine-impregnated charcoal cartridges. A full-face mask (gas mask)** equipped with a canister containing iodine-impregnated charcoal, a continuous flow positive pressure air-line respirator or self contained positive pressure breathing apparatus (pressure-demand-type) as described in 30 CFR, Part 11, must be worn if the concentration exceeds 0.5 mg/m^3.

4. Protective clothing, laundering of same, and separate lockers for street and protective clothes shall be provided in areas such as mercury recovery operations where exposures are potentially substantial.

*(1) Comfo II Respirators (MSA-Data Sheet 10-00-03)

(2) Special purpose Ultra-Twin Respirator (MSA #466204)

The above are not NIOSH approved, contact MSA, 600 Penn Center Boulevard, Pittsburgh PA 15235 for current status of the respirators.

**(1) Constant Flow Air-Line Respirator with Facepiece

(A) MSA #460863

(B) MSA # 460864

SECTION IX

MONITORING METHODS AND REQUIREMENTS

1. The instrument of choice for qualitative area sampling (available at this Laboratory for loan) is the Bacharach Model MV-2 Mercury Vapor Sniffer which is based on the absorption of ultraviolet light at 2537A by mercury vapor. This is a continuous sampling instrument with a low range of 0 to 0.1 mg per cubic meter full scale and a high range of 0 to 0.2 mg per cubic meter. The accuracy of this instrument is inconsistent because the sensors and/or ultraviolet lamps appear to deteriorate with time. The Field Static Calibration Probe supplied with the instrument is inadequate. If mercury is detected using the MV-2, quantitative sampling should be considered using Hopcolite tubes (Appendix C).

2. Sampling and analysis can also be performed using 1:1 0.5N $KMnO_4$ and 2.0 N H_2SO_4 as an absorption medium. Prolonged sampling requires two midget impingers in series (NOTE: impingers are preferable to fritted bubblers). The time between addition of absorbing solution and completion of sampling should not exceed four hours. Analysis is performed by the dithizone method (Ref 9).

3. Another proposed technique published in the NIOSH Manual of Analytical Methods utilizes tubes containing two sections of silvered substrate chromosorb P to collect samples. Analysis is by thermal desorption and flameless atomic absorption. A three-section system with a Millipore prefilter is needed if particulate mercury is present. Method No: P & CAM 175. Analysis of samples using this technique is not provided by the USAF OEHL. The USAF OEHL technique is Hopcalite tubes (see Sampling Methods for Selected Substances, USAF OEHL, November 1979).

4. A study of mercury indicator tubes made a number of years ago at the McClellan Environmental Health Laboratory (EHL) indicated that a batch of MSA tubes checked was unreliable for quantitation of mercury vapor levels in air.

5. The 3M Company offers a mercury dosimeter including analysis similar to a standard film badge service. The user buys the dosimeters, exposes them, returns them to 3M, and 3M in turn supplies the user with the time-weighted average mercury concentration. Information concerning this service is available from: Occupational Health and Safety Products Division/3M, 3M Center, St Paul, Minnesota 55101, (800) 328-1300.

6. The Jerome Instrument Corporation produces a reusable dosimeter which must be used in conjunction with their model 401 Gold Film Mercury Vapor Analyzer. This instrument will be evaluated by USAF OEHL/ECH personnel and if appropriate it will be included in TA 906. Information concerning this equipment is available from: The Jerome Instrument Corporation, P.O. Box 988, Bell Road, Jerome, Arizona 86331, (602) 634-5908 or P.O. Box 455, Concord, New Hampshire 03301, (603) 224-7342.

7. The NIOSH Criteria Document (Ref 7) may be used as a guide for maintaining records of personnel exposure to mercury.

SECTION X

TOXICITY OF MERCURY

1. Mercury is slowly oxidized to ionic mercuric mercury, partly in the blood and partly in the tissues; therefore, the tissue distribution resembles that of inorganic ionic mercury with high concentrations in the kidney, liver, mucous membranes of the intestinal tract, mucous membranes of the salivary glands, thyroid, and testes (Ref 11).

2. The relative accumulation of mercury in the central nervous system, particularly the brain, following exposure to mercury vapor is consistent with the clinical observation that the central nervous system is the critical organ in man in chronic exposure to mercury vapor (Ref 11).

3. According to Henderson (Ref 10) eighty to ninety percent of the mercury vapor inhaled in a single breath is absorbed. It takes only a few seconds for blood to circulate from the lungs to the brain. Two or three breaths of air inhaled from a contaminated hand may result in more mercury getting into the brain than a whole work-shift of breaths at the allowable limit. The foregoing may account for the conflict between the variation in signs and symptoms resulting at supposedly equivalent occupational exposure levels.

4. The following symptoms and signs may occur in less severe mercury poisoning, and their occurrence in an exposed individual should prompt further study. The symptoms are weakness, fatigability, loss of appetite, loss of weight, insomnia, indigestion, diarrhea, metallic taste in mouth, increased flow of saliva, soreness of the mouth or throat, inflammation of the gums, black line on the gums, loosening of the teeth, irritability, loss of memory, and tremor of the fingers, eyelids, lips or tongue.

SECTION XI

FIRST AID TREATMENT

1. Inhalation: If a person breathes in large amounts of mercury, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible (Ref 8).

2. Contact with eyes: If mercury gets into the eyes, immediately wash the eyes with large amounts of water, for 15 minutes or more, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with mercury (Ref 8).

3. Skin Contact: If mercury gets on the skin, promptly wash the contaminated skin with soap or mild detergent and water, for 15 minutes or more. If mercury soaks through the clothing, promptly remove the clothing and wash the skin with soap or mild detergent and water, get medical attention promptly (Ref 8).

SECTION XII

URINARY MERCURY LEVELS

1. Henderson (Ref 10) has reported the lack of correlation of individual urinary mercury values with estimates of exposure based on measurements of concentrations of mercury vapor in the general work environment. It is apparent that work habits, contamination of skin and clothing, and personal hygiene can have a greater influence on the exposure to mercury vapor than the concentration of mercury vapor in the general environment even if the measurement in the general work environment is made at breathing height. There is a difference in the microenvironment next to the skin and clothing compared to the concentration in the general work environment. The data in Table II show results obtained by Henderson which seem to validate these conclusions. It is felt by Henderson that measurements in the general work environment may underestimate the exposure during the work day by a factor of at least two and possibly as much as five or six.

2. Table III data show the relationship between the urinary mercury levels and air-borne mercury levels for a large sample population.

3. Urine samples collected during the fourth, ninth, eighteenth and thirty-first week following cessation of exposure to high concentrations of Hg vapor contained the following respective average concentrations, 0.54, 0.32, 0.17 and 0.07 mg/liter but the range of variation was slight (Ref 6). This study was cited to show that high mercury in urine levels can persist months after exposure.

Table II

MERCURY VAPOR CONCENTRATIONS IN AIR
NEAR CONTAMINATED CLOTHING AND SKIN

October 24-26, 1974

Locker Room	Mg Mercury/ Cubic Meter of Air
General Room Atmosphere	0.03 - 0.04
Air Near	
1. Outer clothing furnished by company and laundered daily; worn one shift before measurements	0.1 - 0.2
2. Gloves	0.08 - 0.2
3. Hands (before washing)	0.5 - 0.6
4. Clean hands (washed)	0.4 - 0.08
5. Sweater (employee in mercury recovery area)	0.2 - 0.5
6. Rubber coated shoes (inside)	0.2 - 0.05
(outside)	0.10 - 0.5
7. Cotton undershirt worn approximately 6 hours in cell room. Person had no known contact of outer clothing with liquid mercury nor salts of mercury	0.01
8. Cell room, breathing height - October	0.06 - 0.116
- November	0.02 - 0.08

TABLE III

URINARY MERCURY ANALYSES

Group Exposure Level	Mean Hg Conc. mg/l	No of Analyses
Control	0.03	415
0.1 mg/M^3	0.06	528
0.5 mg/M^3	0.17	521
1.0 mg/M^3	1.45	77

APPENDIX A

COMPARISON OF SELECTED CLEANUP PROCEDURES

AF/EHL (Mr. Diamond) 18 September 1973

Reduction of Exposure to Mercury, Suggestion No. RIC 413-73M

AFLC/SGB
Wright-Patterson AFB OH 45433

1. The comparative efficiency of two mercury clean-up procedures were evaluated with regard to Suggestion No. RIC 413-73M. The first technique involved a Mercury Sweeper (C6375) recommended by the suggestor and obtained from Scientific Products. The second technique involved vacuuming visible droplets into an aspiration bottle and water trap and covering the area with a solution of HgX (essentially calcium polysulfide).

2. Tests were conducted on carpet samples obtained from Capt Gardner of HFO-WR. He stated these are samples of continuous filament nylon carpeting commonly used in dental treatment rooms. The results are listed below. All readings were taken 1/2 inch above the carpeted surface. Each pair, i.e., 1 and 2, were tested on the identical carpet weave.

Sample	Device	Air Concentration Hg Prior to Treatment mg/m^3	Air Concentration Hg After Treatment mg/m^3
1	Mercury sweeper	0.4	0.7
2	Vacuuming + HgX	0.5	0.10
3	Mercury Sweeper	0.9	>1.0
4	Vacuuming + HgX	0.6	0.05
5	Mercury sweeper	0.8	0.9
6	Vacuuming + HgX	0.5	0.1

3. The mercury sweeper was also tested on a flat or relatively flat surface and successfully picked up mercury globules on this type of surface leaving no detectable residual. The main focus of the evaluation was on carpeted surfaces since Major Gray, Assistant Base Dental Surgeon of Richards-Gebaur, indicated the problem is that many dental clinics have carpeted floors.

4. Based on the laboratory evaluation performed, the Mercury Sweeper is essentially ineffective on carpeted floors. The preferred method of

cleanup on carpeted floors is vacuuming with either a MerVac (specially designed vacuum cleaner) or water trap aspiration system followed by a wet HgX or calcium polysulfide treatment. This is a more satisfactory method. This study reinforced the recommendation given in Pacific Health Bulletin, Navy Environmental and Preventive Medicine Unit No. 6, *July 1973, No. 55 and H. Buchwald, "Exposure of Dental Workers to* Mercury," American Industrial Hygiene Association Journal, Vol. 33, No. 7, that carpeting should not be used in dental clinics.

FOR THE COMMANDER

SIGNED

JOHN J. GOKELMAN
Major, USAF, BSC
Chief, Field Support Division

APPENDIX B

MERCURY DECONTAMINATION TECHNIQUES

LETTERS TO THE EDITOR

Arch Environ Health - Vol 13, Nov 1966

VAPORIZATION OF MERCURY SPILLAGE

To the Editor--The problem of the vaporization of the inevitable small droplets of mercury trapped in cracks and benches and floors is common to many laboratories and industries and presents a potential mercury hazard.

Traditionally flowers of sulfur has been recommended for fixing mercury. In order to investigate the efficacy of this measure, a plastic enclosed chamber was established around a Beckman K23 mercury vapor meter. Mercury contained in a Petri dish could be introduced into this chamber while at the same time, in order to simulate practical conditions, air movement through the chamber was provided by means of a pump drawing air through the chamber at a rate of 1 liter/min. The temperature in the chamber was 28°C.

The Table gives a summary of the results obtained. The right hand column indicates the efficiency of the various fixing agents investigated. The packing material (approximatley 5 mm in average diameter) and flour were chosen as being inert particles of coarse and fine size respectively to establish whether a physical barrier of this type was effective in trapping the mercury vapor.

REDUCTION OF VAPORIZATION OF MERCURY

System	Conditions	Mercury Concentration (Mg/Cu M)	Levels Expressed as % of Hg Level With No Fixture
Mercury		0.2-0.3	
Mercury + coarse inert particles	Layer 5 mm thick	0.3	100%
Mercury + fine inert particles	Layer 5 mm thick	0.2-0.3	67%-100%
Mercury + dry flowers of sulfur	Thin layer (less than 1 mm thick)	0.1-0.2	33%-67%

REDUCTION OF VAPORIZATION OF MERCURY (Cont)

Mercury + dry flowers of sulfur	Layer 5 mm thick	0.00	25%
Mercury		0.2	
Mercury + aerosol commercial hair spray		0.03-0.04	15%-20%
Mercury		0.2	
Mercury + CaO (equal parts of each)		0.1	50%
Mercury + CaO + S (equal) parts of each)		0.03-0.00	40%-45%
Mercury + (CaO + S + H_2O) mixture		0.01-0.02	5%-10%

The results of this investigation show that the use of a sulfur calcium oxide and water mixture was the most successful method for fixing mercury droplets. A second convenient technique particularly suitable for mercury in inaccessible crevices is the use of an aerosol hair spray.

Since the investigation was carried out it has come to our notice that a chelating soap is available in some countries and this would presumably be the method of choice in dealing with spillages. However, it is hoped that the information given above will be of interest and may be useful in showing, once and for all, the inefficiency of flowers of sulfur alone for this purpose.

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Occupational Health Unit,
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APPENDIX C

MV-2 CALIBRATION

ECH 22 JUL 1979

MV-2 Calibration

USAF OEHL OL AD

1. Per your request, a midget impinger with 1 ml of clean mercury was connected directly to a MV-2 Mercury Sniffer. A constant flow of 50 cc/minute was maintained through the system using a Dupont P-200 pump to push air through the impinger. The temperature in the impinger was 74°F with an absolute pressure of 29.29 mmHg. The MV-2 indicated a concentration of .75 mg/cubic meter of mercury vapor on five consecutive runs.

2. Problems were encountered when this procedure was tried on several instruments under identical environmental conditions. Readings varied from .5 mg/cubic meter to off scale. All instruments were checked with their Field Calibration Probe and were on the last factory calibration settings.

3. Bacharach Instrument Company was contacted concerning the wide variability of these readings. Ms Frasier, Manager of Repair and Calibration, and Mr Marco, Chief Electronic Technician for Bacharach, stated the probable causes of the inconsistent readings were a deteriorating sensor and/or a UV lamp. He also implied that the Field Static Calibration Probe was extremely inadequate and Bacharach was considering eliminating the Field Static Calibration Probe from the MV-2 Mercury Sniffer. Bacharach was considering several alternatives for a field test mechanism; however, that would be at least a year away.

4. We are presently enclosing a statement concerning the accuracy of the MV-2 Mercury Sniffers which we loan to requesting agencies. We are recommending the MV-2 be used for general sampling. If mercury is detected, TWA sampling should be considered using Hopcolite Tubes to determine actual amounts present.

(signed)
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